CHAPTER 1
INTRODUCTION

The City of Warwick evolved from a scattered group of agricultural and maritime settlements. As the industrial revolution developed, factories and textile mills were constructed along the principal waterway, the Pawtuxet River, and resort communities sprang up along the Bay Shore. The scattered maritime, agricultural, industrial, and resort communities were connected by a transportation system of roads, and later in the early 20th century, by a system of trolleys and roads. Although the trolleys have disappeared, the network of roads is very much what is in place today for the City's circulation system.

The City grew as a suburb in the post World War II era. The suburban residential developments were generally cut out of forest and farmland and the residential streets were connected to the pre-existing road system. The City had no central business district after West Warwick was formed in 1913, this led to the growth of residential development around the villages, and commercial strip development became the focus of the principal roadways connecting the villages.

In 1931, after a construction period of two years, the state airport was dedicated in the Hillsgrove section of the City. This facility has grown considerably over the years to accommodate the trends in air travel, and now occupies nearly 1,000 acres of land in the center of Warwick. This location, as well as the fact that the airport is a land use with unique attributes, creates a challenge to the City's circulation system.

The construction of the interstate highway system through Warwick has also had a major impact on land use and circulation. Interstate 95 was completed in 1966 and I-295, which connects to I-95 in Warwick, was completed in 1968. Interchanges were established in the City to connect major arterials to the interstates at Routes 2, 37, 113 and 117. The airport connector tied the interstate system to the airport, and the Jefferson Boulevard exit connected the interstate to the City's industrial heartland.

The interstates created access to Warwick in a totally new manner and the advantages of this were captured by the quick construction on Route 2 of the Rhode Island Mall (formerly the Midland Mall) and the Warwick

Mall. This commercial focus on Route 2 has continued, creating a nearly continuous strip of commercial development from Cranston to East Greenwich.

The transportation, circulation system of the City of Warwick is very reflective of our national social and economic systems. In a recent scholarly article by John Pucher, published in the *Journal of the American Planning Association*, the author points out that the automobile, "...by enabling almost unlimited freedom of movement and location, embodies the principles of individualism, privatism, consumerism, and high mobility". This has come at a price which includes dispersion of land uses, often referred to as sprawled development; air pollution; traffic congestion; noise pollution; and as we have discovered, vulnerability to petroleum supply disruption. However, the technologies of automobile transportation, and indeed all forms of transportation, are not static. They are for instance sensitive to factors of cost, materials substitution, alternative fuel systems, and regulation.

With these considerations in mind it would appear that the City of Warwick, like its sister communities throughout the nation, will remain primarily automobile oriented with respect to travel and mobility. This is not to say that alternative modes of travel are not viable companions to the automobile, or that new modes of travel will not evolve and assume a place in the suite of transportation options available to city residents. For many reasons, residents may choose to utilize public transit, minibus demand-response operations, train, airplane, bicycle or waterborne transportation. The success of these diverse modes will depend on their cost, the mode's ability to fit the need, and the marketing ability of the alternative modes' managers. The status of the various modes of transportation and their relationship to the City of Warwick and to each other is discussed in the following section.

CHAPTER 2

COMMUNITY PROFILE AND NEEDS ANALYSIS

Roads and Highways

The preeminence of the automobile as the primary means of travel may be obvious to everyone but statistical evidence in several categories of measurement ranging from acres of land devoted to roads and highways, to neighborhood concerns, to automobile registrations; furnish convincing proof that the automobile age is flourishing in Warwick

1. **Land Use** - The 1985 inventory of land uses prepared for the 1986-1991 Land Use Plan for the City of Warwick determined that roads totaled more than 3000 acres of the city's land area, or 14.5 percent of the city. This is an increase of 3.74 percent over 1972, and represents the third largest single category of use after single family housing and vacant/undeveloped land. This is not unusual, especially in a suburban community where the primary means of travel is the automobile.

2. **Motor Vehicle Registrations** - There are nearly 75,000 motor vehicles registered in Warwick and the number of registrations has been increasing, from 1984 to 1988, the most recent years available, the number of registrations increased by 12 percent. The City's population during the decade remained relatively stable. The following data, as shown on Table 1, profiles the community for the sample years 1984 and 1988. The total number of vehicles registered in Warwick represents nearly 10 percent of the state total, and is second in the state. Only Providence has more motor vehicle registrations.

Table 1
Motor Vehicle Registrations By
Vehicle Classification 1984 and 1988

YEAR	1	2	3	4	5	6	7	8	TOTAL
1984	54,722	5,755	951	1,430	106	26	520	2,245	65,755
1988	59,998	7,173	1,248	2,050	88	20	779	2,465	73,821

PercentChange	+9.6%	+25%	+31%	+43%	-17%	-23%	+50%	+9.7	+12.2%

Notes: Classification Codes for the Aforementioned Table

1-Gasoline Auto
2-Gasoline Trucks <6001 Lbs.
3-Gasoline Trucks 6001-8500 Lbs.
4-Gasoline Trucks >8500 Lbs.
5-Diesel Auto
6-Diesel Trucks <8501 Lbs.
7-Diesel Trucks >8501 Lbs.
8-Motorcycles

3. **Citizen Concerns** - Traffic problems were cited more by residents than any other single issue in the Citizen Survey conducted for the 1986-1991 Land Use Plan. Twenty-eight percent of the respondents placed this issue highest among their concerns. Fourteen percent listed noise as a major issue. The neighborhoods especially impacted by the airport responded much higher than the citywide total for noise, while neighborhoods adversely impacted by commercial strip development listed traffic as a higher concern than the citywide total. These concerns are tabulated in Table 2.

The State Division of Planning forecasts that by the year 2010, Warwick will have 84,074 registered vehicles. This will be an increase of nearly 18 percent over the 1988 total (Columns 1-7, Table 2), further exacerbating the traffic congestion in the City of Warwick. The increase in motor vehicles and population over the past two decades is dramatically reflected in the increased traffic volumes measured at selected locations in the city between 1972 and 1989. These increases, shown in Table 3, range from 21 percent to 70 percent and average 46 percent.

4. **Accidents** - Rhode Island Department of Transportation Accident Data covering the period 1984 through 1988 clearly reveals that traffic accidents in Warwick have increased in every category measured as shown in Table 4. The rate of increase for all accidents during the period was 36 percent. This exceeds the rate of increase of motor vehicle registrations (12 percent) in the City for that period, and the rate of increase in accidents statewide (27 percent). The City consistently has a high number of fatalities, compared to other Rhode Island cities and towns.

Table 2

1986-1991 Land Use Plan
Neighborhood Circulation Issues
Percent of Respondents Highest Concern

Neighborhood	Issues	
	Traffic	Noise
Lakewood, Pawtuxet, Gaspee	----	----
Hillsgrove, Norwood	40%	20%
Spring Green, Pilgrim Park	19	33
Governor Francis, Gaspee Plateau	----	25
Greylawn	62	42
Hoxie	41	----
Conimicut	38	----
Longmeadow	54	----
Warwick Neck	21	----
Oakland Beach	43	----
Meadowbrook and Old Warwick	22	----
Greenwood East	42	55
Wildes Corner	----	47
Buttonwoods	9	----
Apponaug, Nausauket, Arnolds Neck	37	24
Greenwood	39	----
Cowesett	19	----
Bald Hill	52	----
Pontiac, Natick	----	----
Potowomut	----	----
City Wide	28	14

Table 3
Comparisons of 1972 and 1989
RI Department of Transportation Annual 24-hour
Average Daily Traffic at Selected Locations
for the City of Warwick

Locations		Direction of Travel	1972 ADT	1989 ADT	Percent Increase
1	West Shore Road and Main Avenue	East-West	24,000	35,000	46%
2	Airport Road	East-West	23,000	39,100	70%
3	Route 117 West of Apponaug	East-West	19,000	23,000	21%
4	West Shore Road in Conimicut	North-South	10,700	17,000	59%
5	Warwick Ave. North of Airport Road	North-South	25,000	31,700	27%
6	Airport Connector	North-South	13,500	18,800	39%
7	Bald Hill Road	North-South	25,000	38,100	52%
8	I-95	North-South	72,900	109,200	50%

Table 4
Motor Vehicle Accident Data 1984-1988
City of Warwick

	1984	1985	1986	1987	1988	Percent Change 1984-1988
Accidents	2,104	2,292	2,978	2,721	2,862	+36%
Fatal Accidents	3	7	11	13	16	+433
Injury Accidents	787	790	1,127	951	993	+26
Property Damage Acc.	1,314	1,495	1,840	1,757	1,853	+41
Fatalities	4	7	13	14	17	+325
Injuries	1,099	1,127	1,622	1,310	1,467	+33

A review of the accident location data has determined there are 19 locations within the city where annually 10 or more accidents have occurred between 1986 and 1988 (see Figure1).

All of these locations, as shown in Table 5, are at or near intersections on state numbered highways.

Table 5
Locations in Warwick with Ten or More
Accidents Annually 1986-1988

Location	Accident Contribution Factors
1. Improvements Completed Since 1988	
A. Post Road (Rte. 1A) at Rte. 37 West	B, E, F, G
B. Post Road (Rte. 1A) at Airport Road	B, G
2. Improvements Scheduled by State TIP	
A. Post Road (Rte. 1A) at the Airport Connector	B, E, F
B. Post Road (Rte. 1A) at the Greenwood Bridge	A, B, C, F, G
C. Route 2 at Tollgate Road (Rte. 115)	B, E, F
D. Route 2 at Centerville Road (Rte. 117)	B, D, E, F
E. Route 2 at Cowesett Road	B, E, F
F. Apponaug Four Corners	B, E, F, G
G. Warwick Avenue at Sandy Lane	A, B, D, E, F
H. Hoxie Four Corners	B, E, F
3. Locations that Need Study	
A. Main Avenue (Rte. 113) at Rte. 5	B, E, F
B. Route 2 at West Natick Road	B, E, F
C. Route 2 at East Avenue	B, E, F
D. Route 2 at College Hill Road	B, E, F
E. Tollgate Road at Centerville Road	A, B, E, F
F. Route 117 at Buttonwoods Avenue	B, E, F, G
G. Route 117 at Oakland Beach Avenue	B, E, F, G
H. Route 117 at Warwick Avenue	B, E, F, G
I. Wildes Corners	A, B, C, E, F

Note: (A) poor geometric configuration of roadways;
(B) heavy traffic volumes
(C) inadequate line of sight
(D) inadequate signalization
(E) driver error and excessive speed;
(F) many turning and other conflicts; and
(G) inadequate pavement widths and/or insufficient lanes.

It is important to be aware that the accident data is valuable to indicate possible problems in the condition of roadways. The data utilized for the period 1986-1988 does not reflect the most recent road improvements. The reporting system assigns the accidents to the nearest intersections, but the actual location may not be exactly at the intersection.

A field inspection of the intersections listed in Table 5 determined that some intersections such as the Greenwood Bridge and Wildes Corners are characterized by unusual geometric configurations which create problems as they are required to handle large volumes of traffic. Other locations are affected by large volumes of traffic but the signals and geometry appear not to be a problem. The number of accidents may appear high but the actual frequency based on the ratio of accidents to traffic volume may not be very high. Where there are no discernible geometric, line of sight, or signal problems, accidents are probably more a result of turning conflicts or driver error, including excessive speed, such as may be the case at Route 2 and West Natick Road. The factor analysis of the locations that need study shown in Table 5 reveals that the combined effects of heavy traffic, turning conflicts and driving error represent 82 percent of the basis for accidents.

5. **Functional Classification of Roads and Highways -** Functional classification is the process of grouping streets and highways according to the character of their intended use.

   The basis of the system is the relationship between the roads and the functions they serve which generally are grouped into two fundamental services:

   a) **Access to property**, and
   b) **Travel Mobility**

   Most roads perform varying degrees of these services and it is the combination of these services that determines how the road is classified into the following categories:

   a) **Local Road** - emphasizes access to property.
   b) **Collector Road** - offers a balance between property access and travel mobility.
   c) **Arterial** - emphasizes a high level of mobility for through movements.

   The classification is also based on the type of area served, based on the U.S. Bureau of the Census definitions of urban area, small urban area and rural area (Figure 2). The rules governing the federal aid highway classification system require that the urban area boundary

must smooth out boundary irregularities, encompass fringe areas of residential, commercial, industrial, national defense, and transportation significance; include major highway interchanges where logical; and consider transit service areas. This system of classification is used by the state in developing long-range transportation plans and in determining federal aid funding categories. It is also used to determine jurisdiction for highway maintenance responsibility. Classification and eligibility under this system does not automatically mean that federal funds are available for improvements.

The City of Warwick is completely encompassed by the Providence- Warwick-Pawtucket urbanized boundary. Table 6 shows the functional classification breakdown of roadway in Warwick and the relationship of functional classification to the Federal-Aid System. Appendix B lists the streets and highways in Warwick that are included in the State Functional Classification for the period 1995-2005.

Table 6
Length of Roadway by Functional Classification
in Warwick and Relationship between
Functional Class and Federal Aid Funding

Classification	**Length (miles)**
Interstate (Urban)	9.20
Other Freeway (Urban)	2.75
Connecting Rural Principal Arterials (Urban)	11.45
Connecting Rural Minor Arterials (Urban)	2.20
Principal Urban Arterials	21.55
Minor Urban Arterials	11.70
Urban Collectors	36.90
	95.75
Local	450.00
Functional Classification	**Federal-Aid Funding Category**
URBAN AREA	
Interstate	Interstate
Principal Arterial-Connecting Link	Primary

Principal Arterial-Non-Connecting Link	Urban
Minor Arterial	Urban
Collector	Urban

6. **Scheduled State Improvements** The Rhode Island Department of Administration, Division of Planning, in conjunction with the Rhode Island Public Transit Authority, the State Department of Transportation, and the cities and towns, prepares the Transportation Improvement Plan (TIP). The inclusion of a project in the T.I.P. makes the project eligible for federal funding.

Type of TIP Projects – Indicated below are the nine types of projects scheduled by the TIP:

1. Interstate - These connect principal metropolitan areas;

2. Interstate 4R - These maintain the existing interstate system;

3. Primary - These are to develop a system of main roads for interstate, statewide, and regional travel, consisting of rural arterial routes and their extension into and through urban areas. Activities eligible for federal funding in this category include the construction of bus lanes, highway traffic control devices, bus passenger loading areas and facilities, fringe and transportation corridor parking to serve mass transportation passengers, and programs for roadway resurfacing, restoration and rehabilitation (3R).

4. Urban - These are for the improvement of service to major centers of activities in urbanized areas. Activities that are eligible for funding typically are projects aimed at obtaining maximum highway efficiency through traffic engineering such as minor roadway widening, modernized traffic signalization, traffic channelization, and bus loading areas and facilities.

5. Rural Secondary - This category of funding is to assist state and local governments improve federal-aid secondary systems. Eligible activities include design, right-of-way acquisition and construction, and a portion of this funding category must be expended on 3R projects.

6. Highway Safety - This is for improving driver, vehicle and roadway safety. It includes driver education and motor vehicle inspection, and provides for design, construction and maintenance improvements which include activities such as pavement marking, elimination of roadside obstacles and high hazard and road/rail crossing elimination.

7. Bridge Replacement - This program is for the replacement or rehabilitation of important highway bridges on any system, and at least 15 percent of the total expended statewide must be for bridges that are not on the federal aid highway system.

8. Urban Mass Transportation - This category provides capital and operating cost assistance for improvements to urban mass transportation systems. Eligible capital costs include buses, mini buses, garage equipment, and special equipment for elderly and handicapped bus transportation.

9. Airport Improvement - This program provides for planning, design, acquisition, and construction of airfield facilities such as runways, taxiways, lighting, public terminals, and safety equipment (e.g., fire trucks and garages). The funding is earmarked for different types of airports and programs, including noise abatement and noise mitigation for schools and residences.

Projects Scheduled for the City of Warwick - The State Transportation Improvement Program for the period 1989-1995 has scheduled nine (9) highway and one (1) bridge improvement project for the City of Warwick, shown in Table 7. The total estimated cost of the work programmed is $40.15 million, and will improve conditions at nine (9) of the intersections identified in Table 5 as locations with ten or more accidents annually from 1986 through 1988.

While these improvements will increase highway capacity and improve traffic flow, they are often perceived by local residents as insensitive projects that cater only to automobiles and not to the neighborhoods and residents. During the planning and design of roadway improvements, greater attention is required to safely accommodate bicycle use, street aesthetics, and pedestrian access.

The bicycle can be an alternative travel mode for neighborhood trips. It can reduce automobile trip traffic and it is highly energy efficient. The incorporation of bicycle travel ways into the reconstructed road can also aid in the development of a city wide and regional bicycle path system that utilizes a combination of exclusive bikeways and restricted or shared bikeways. Exclusive bikeways are for bicycles and can accommodate pedestrians, but are restricted for motorized vehicles. Restricted bikeways are established within the limits of a roadway for preferential bicycle use, and shared bikeways are for low traffic volume roadways where the motor vehicles and bicycles utilize the same travel lanes.

Street aesthetics are affected by the types and textures of materials utilized for pavement, curbing, sidewalks, crosswalks, retaining walls, and plantings. The lack of good aesthetics creates a sterile environment and degrades the neighborhoods that the roads are designed to

serve. The planting of trees is particularly effective for enhancing the streetscape, and they are environmentally beneficial because they provide shade, they act to cool the surrounding atmosphere through evapotranspiration, and they remove air pollutants.

Pedestrian safety is important to the lives and health of citizens. It is also important to the economic vitality of neighborhood businesses. If pedestrian access to local shops and neighborhood businesses is reduced or eliminated by the construction of a wider roadway that carries rapidly and freely flowing traffic, the economic strength of the community is damaged. The reduction in pedestrian access can be real or perceived by neighborhood residents. Design considerations should include assurance of viable pedestrian movement through installation of sidewalks, self activated crossing signals, well defined crossings, reduced traffic speed, separated pedestrian crossings, if appropriate, and other effective means to create a friendly environment for pedestrians.

Future improvements need to be programmed for the following roadways that are on the federal aid system. These recommendations are based on the Department of Public Works review of the facilities and the determination that the facilities are inadequate to meet the demands of vehicular and pedestrian travel and/or do not provide adequate shoulders and drainage.

Main Avenue
Warwick Avenue from West Shore Road to Oakland Beach Avenue
Cowesett Road

Also, three feasibility studies should be performed to determine if accessibility can be improved in two locations of the City. First, the Route 37 extension feasibility study should be performed in an effort to find a means of providing eastern sections of Warwick with an alternate access to the west, particularly to I-95. Currently there are only three means of access from east to west:

through Apponaug;
Main Avenue; and
Airport Road.

These routes are heavily traveled, congested, and have experienced significant increases in traffic volume in recent years, as shown on Table 3. The service area of these routes had a 1980 dwelling unit count of approximately 16,000 residences with a population of nearly 45,000 persons.

The second study should be performed by the city to identify other means of improving east/west circulation on a neighborhood or planning district basis.

Finally, a feasibility study for the construction of additional ramps at the I-95/Route 2 interchange to improve access to Route 2 businesses should be conducted. Current restrictions imposed by the existing ramp configuration limit the on/off movements for Route I-95 northbound and southbound. This can result in increased trip length and added costs.

The City's proposed alignment of the Route 37 extension would carry the roadway east and south to an intersection with Airport Road west of Hoxie Four Corners. Said alignment would increase the number of east-west connections in the City north of the airport. This would provide better access to the neighborhoods of Spring Green, Pilgrim Park and Cole Farm and would reduce overall traffic densities at the intersection of Post Road and Airport Road.

7. **Bridges -** There are seventy state numbered bridges in Warwick. This represents nearly 10 percent of the 705 bridges statewide. All bridges in Rhode Island greater than 20 feet in lengths are assigned a number by the State Department of Transportation for the purposes of inspection. These bridges may not be all state owned but they are inspected by the state. It is possible to have a bridge constructed and owned by the state but maintained by the local municipality. A bridge within the state highway line is state maintained. The listing of all state numbered bridges in Warwick is shown in Table 8.

The State Department of Transportation has developed a Comprehensive Bridge Improvement Plan for the State's 705 bridges which is designed to assure that the bridges are properly maintained. Those most in need of repair or replacement are assigned the highest priority for construction. The Plan utilizes five parameters for the priority assignments:

1) structural adequacy;
2) type of bridge;
3) bridge posting;
4) average daily traffic; and
5) roadway classification.

These parameters are weighted by the State Classification System so that those bridges that have the highest need of structural repair, the most likely to have a severe failure, are posted with the lowest capacity ratings, limiting their ability to provide for safe passage of emergency vehicles, school buses, and the like. Bridges that are heavily traveled

and are highest in the Roadway Classification System are ranked highest.

In accordance with this plan, sixteen (16) of the 70 bridges shown in Table 8 are scheduled for improvements by the Bridge Improvement Program 1990-1995 at a cost of nearly $13 million, (Table 9.) In addition to the repairs scheduled by the State, the Forge Road Bridge, No. 991, crossing the Potowomut River at the Warwick-North Kingstown Corporate Boundary is under design for rehabilitation. The Department of Public Works through its evaluation of the Forge Road Bride and the East Ave Bridge over the Pawtuxet River, neither of which are maintained by the State, according to the Rhode Island Department of Transportation as shown on Table 8, believes that both bridges should be programmed for major reconstruction under the State's Bridge Improvement Program.

8. **Local Streets** - There are approximately 450 miles of local streets and roads that are the responsibility of the city of Warwick. The Department of Public Works maintains these streets including: repairing the pavement, striping where necessary, maintaining the integrity of the road shoulder and clearing vegetation along the roadside, plowing and sanding/salting in the winter, and maintaining the drainage systems. If the road is on the functional classification, as indicated in Appendix B, the city's responsibilities for repair and/or reconstruction of the roadway may be assisted through funding from the state aid system.

The Department of Public Works has a pavement management system that subjectively rates the city's streets based on the "ride" that the streets provide. The Department evaluates approximately one half of the city streets annually. The evaluation results are computerized and are used to formulate the schedule of repairs. This system can be improved by using more objective evaluation criteria. New streets that are proposed as part of subdivisions of land are designed in accordance with the standards contained in the subdivision regulations. The city accepts new street upon the completion of the finish surface of the roadway, the drainage system and the installation of the sidewalks. Appendix A contains recommended design standards for streets and highways.

Subdivision circulation design should be appropriate for the site. Design should consider topography, drainage, natural features, and aesthetics. It should also meet the needs of residents, pedestrians and drivers. The street design should protect residents from the noise and hazards of through traffic; however, the prevention of through traffic should not be the sole rationale for subdivision design.

Warwick has many subdivisions which are characterized by cul-de-sacs and adjacent subdivisions which are not interconnected. The lack of interconnections between subdivisions in many instances creates inefficiencies in circulation and result in inefficient service delivery. Emergency vehicles are required to pursue circuitous routes, lengthening their response time. Water service connections may not be optimally looped and/or interconnected, leading to pressure and/or stagnation problems. Traffic is directed toward existing through streets, increasing the noise and hazard burden, and degrading neighborhood quality of life, rather than creating a more even distribution of flow.

There are paper streets in the city that could interconnect some older subdivisions. By not being developed, they often create inefficiencies by forcing residents to journey to more heavily traveled roads to simply drive to an adjacent neighborhood. This wastes energy and contributes to the congestion on the more heavily traveled roads. If these paper streets are abandoned by the City, all opportunity to reduce or eliminate the inefficiency is lost.

9. **Y2K Buildout Traffic Analysis**

Supplemental to the Land Use Element, a "Buildout" of current zoning was prepared to determine the availability of residential, general business, office, light industrial and general industrial land in the city. Rates of development were estimated in the supplement to determine the future availability of land to meet the city's growth requirements and also to estimate the impact of that growth on the municipality.

Traffic is a function of land use and traffic congestion can be caused by high density development and high traffic generating uses where transportation systems are limited.

The Institute of Traffic Engineers (ITE) rates

traffic generations according to major land use categories. These rates are summarized in Appendix C, Table 6. Single family detached housing generates 10.06 trips per average weekday, the highest generation rate for all forms of residential development. Warwick is predominantly single family detached residences and it is expected that this form will continue to dominate future residential development.

Office building development generates a range of traffic volumes depending on the type of office. Medical offices, a type of office development expected to cluster near and around Kent County Hospital, generates 34.17 trips per 1,000 square feet of office space, the highest rate for the office building category. Research centers generate only 6.09 trips per 1,000 square feet.

Retail uses are heavy trip generators. The range of trip generation is 31.05 trips per 1,000 square feet of space per day to 166.35 trips per 1,000 square feet per day, depending on the overall size of the retail center. Industrial uses are relatively low traffic generators. An industrial park will generate 6.97 trips per 1,000 square feet per day, as will light industrial use, while warehousing, manufacturing and heavy industrial uses vary as trip generators. Heavy industrial uses will generate as few as 1.50 trips per 1,000 square feet per day. The definitions of these uses are listed in Appendix C, Table C-7.

The trip generation requirements of these uses have significant importance for the future of the city's circulation system. Based on the available land and the buildout, an estimate can be made of new trip generation from the five land use categories of residential, general business, office, light industrial and general industrial land uses under current zoning. This analysis is developed in Appendix C Tables C-1 through C-8 and is summarized in Table 10 and Figure 2.

The trip generation analysis is based on the following criteria and assumptions:

1. The rates of development for the five land use categories are those rates estimated in the Land Use Supplement.
2. Existing zoning only is analyzed; no rezoning is analyzed.
3. The number of new trips by each of the five land use categories is based on the Institute

of Transportation Engineers (ITE) trip generation tables.

4. The range of trips represents an estimate based on the simple fact that the future mix of development in the general business, office and industrial classifications cannot be predicted.

5. The estimated total of new trip generation has not been distributed on the state and local road network. This requires complex modeling which is beyond the current scope of work.

6. The volume of new trips can be accommodated by modes of transportation other than by auto, but the auto as the predominate mode of travel will at least be the initial preferred mode of transportation and therefore significant traffic impacts could occur on the principal roadways and at the major intersections in each planning district.

The value of examining buildout effects on the circulation and transportation system is significant. Assuming that the volumes of new trips estimated to be expected by the year 2000 are reached, peak hour auto traffic will push congestion problems in the city to an intolerable level.

To counter this, a variety of steps can be taken by the city of Warwick, in cooperation with state agencies:

1. Continue to improve traffic flow on the existing road network by working with the State Department of Transportation and by implementing development impact fees to assist in the funding of road improvements.

2. Examine the feasibility of extending RI Route 37 to one or more access points in eastern sections of the city to improve east-west traffic flow.

3. Study the city's east-west circulation system to identify new or existing travel corridors that can be improved and thereby help reduce congestion at the three major east-west bottlenecks at Apponaug Four Corners, the Greenwood Bridge, and Hoxie Four Corners.

4. Where development densities permit, develop/modify public transportation routes or expand demand responsive (Transvan) service to provide residents with a viable public transportation alternative to the automobile. Higher development densities should only be permitted along identified transportation corridors.

5. Include bikeways in new and reconstructed road designs to allow for bicycle use on a neighborhood basis as well as on an intra-city and region-wide basis.

6. Improve pedestrian access to neighborhood activities to reduce automobile dependency.

7. Carefully control development densities and the intensity of land use activities through zoning and the preservation of open space and require traffic impact studies for all new major development.

Public Transportation

Fixed Route Scheduled Bus Service - The City of Warwick is serviced by the Rhode Island Public Transit Authority on four scheduled fixed radial routes from points in Warwick to Kennedy Plaza in Providence (see Figure 3):

1. Eddy Street Bus Route 1 serving Gaspee Plateau;
2. Warwick Avenue Bus Route 3 serving Lakewood, Hoxie, Conimicut, Warwick Neck, and Oakland Beach;
3. East Greenwich Bus Route 12 serving Pawtuxet, Elmwood, Hillsgrove, Norwood, Greenwood, Apponaug and Cowesett; and,
4. Reservoir-Pontiac Routes 21/22 serving the Malls and the Pontiac Section.

There is Express Bus Service to Providence from four points in Warwick to Kennedy Plaza:

1. Park-N-Ride lot at Route 117/I-95 west of Apponaug, and
2. Conimicut to the Air National Guard on Airport Road to Kennedy Plaza;
3. Express Bus from the Warwick Mall, Rhode Island Mall and the Community College of Rhode Island to Kennedy Plaza; and
4. The Buttonwoods Express connects the Buttonwoods section to Kennedy Plaza with stops at Wildes Corner and Jefferson Blvd.

Warwick is serviced by two loop bus routes (see Figure 4):

1. The West Shore loop which is entirely within the City serving the Malls, Kent County Hospital, and the neighborhoods along West Shore Road and Post Road from Lakewood to Greenwood;
2. The Pawtuxet Valley loop which serves West Warwick, Coventry, and western sections of Warwick including Apponaug, Kent County Hospital and the Malls.

Other services by RIPTA in the City are:

1. Kennedy Plaza to T.F. Green Airport to Wakefield and the University of Rhode Island during the fall and spring semesters at URI/Kingston; and
2. Quonset Point Service which originates at Kennedy Plaza and stops at the Route 117/I-95 Park-N-Ride and at First Avenue and Main Street in East Greenwich.

According to ridership data furnished by the Rhode Island Public Transit Authority an average of 1700 passengers per day are carried by RIPTA on all routes serving Warwick, this includes the Park-N-Rides. The West Shore Loop averages 78 passengers daily.

The RIPTA service in Warwick is predominantly radial, that is, the trip origin - destination focus is downtown Providence. This characteristic has remained basically unchanged over the past several decades even though population, employment, and other economic activities have become dispersed. The high densities of employment in the Providence Central Business District and other downtown locations continue to generate bus passenger traffic, but not nearly to the extent that once occurred.

Table 7
State of Rhode Island
Transportation Improvement Program 1989-1995
Scheduled Improvements for City of Warwick

Project Description	Rank	Category	90-91	92-32	94-95
1.Apponaug Circulator By-Passes, Post Rd. & Rt. 117 Est.	74	PR	300	RC3000	-----
2. Natick Bridge #026 Rehabilitation	103	B	-----	RC750	-----
3. Post Rd. Rosewood Ave. to Warwick Ave.	110	U	C5000	-----	-----
4. Warwick Ave. Hoxie. 4 Corners to Sandy Ln.	152	U	R500	RC2500	RC2500
5. Rte. 117 - I-95 to Gauvin St.	219	P	RC2000	C2000	-----
6. 3R Tollgate Road - Rt. 117 to Providence St.	243	U	C3500	-----	-----
7. US Rte. 1 - Apponaug to E.G.	254	P	-----	RC3000	-----
8. Rte. 2 - Tollgate Rd. to Cowesett Rd.	283	P	P500	-----	RC5500
9. 3R Post Rd. - Greenwood Br.					

to Post Rd. Ext.	287	U	RC1800	-----	-----
10. Post Rd. - Airport Rd. to Strawberry Fields Rd.	Previously Committed	P	P300	RC4000	C3000
11. Route 113 (Main Ave.)		P			

Notes:

***Cost in thousands**

	Funding Category	Phase Category
Keys:	B-Bridge Replacement	P-Preliminary Engineering/Environmental Studies
	P-Primary	R-Land Acquisition, Relocation
	U-Urban	C-Construction

Table 8
State Numbered Bridges in Warwick

Number	Name	Street	Crossing
773	Airport	Airport Connector	Over Post Rd.
639	Airport Int.	Interstate Route 95	Under Airport Connector
3	Apponaug	Post Road	Apponaug River
138	Apponaug Mill	Centerville Road	Apponaug River
*137	Apponaug Sta. RR	Old Warwick Road	Under Amtrak
723	Bald Hill Ramp	Interstate Rte. 295	Over Pawtuxet River
722	Bald Hill Rd.	Interstate Rte. 295	Over Bald Hill Rd.
638	Boston Post Rd.	Route 37	Over Boston Post Rd.
805	Box Culvert	Interstate Rte. 95SB	95 over Mask. River
802	Box Culvert	Interstate Rte. 95	Over Maskerchugg River
801	Box Culvert	Interstate Rte. 95	Over Maskerchugg River
804	Box Culvert	Interstate Rte. 95	Maskerchugg R&S SC Fwy
161	Buckeye Brook	West Shore Rd.	Buckeye Brook
136	Carpenters Corner	Old Warwick Rd.	Tuscatucket River
684	Centerville Rd.	Interstate Rte. 95	Over Centerville Rd.

425	Centerville Rd.	Bald Hill Rd.	Under Centerville Rd.
772	Collingwood RR	Airport Connector	Over Amtrak
834	Coronado Road RR	Coronado Road	Over Amtrak RR
225	Cottage Home	Warwick Ave.	Buckeye Brook
685	Cowesett Rd.	Interstate Rte. 95	Under Cowesett Rd.
682	East Ave.	Interstate Rte. 95	Under East Ave.
720	East Ave. West	Interstate Rte. 295	Under East Ave.
*336	Farrington	Potowomut Road	Mill Canal
*991	Forge Road	Forge Road	Over Potowomut River
*367	Forge Rd. RR	Forge Road	Under Amtrak
841	Gorton RR	Relocated Post Rd.	Ramps over Amtrak RR
492	Gorton's Pd Culvert	Greenwich Ave.	Over Outlet FR Gortons Pd
681	Greenwich Ave.	Interstate Rt 95	Under Greenwich Ave.
2	GreenwoodRR	Post Road	Over Amtrak
* 79	Hardig Brook	Tollgate Road	Hardig Brook
Number	**Name**	**Street**	**Crossing**
426	Hardig Bk Culvert	Bald Hill Rd	Over Hardig Brook
806	Hardig Bk Culvert 1	Interstate Rte. 95	95 Ramp Over Hardig Brook
807	Hardig Bk Culvert 2	Centerville Rd	Over Hardig Brook
808	Hardig Bk Culvert 3	Interstate Rte. 95	Over Hardig Brook
618	Hillsgrove	Interstate Rte. 95	Under Rd. to Sewer Plant
637	Hillsgrove RR N.	37 WB	Over Amtrak
636	Hillsgrove RR S.	37 EB	Over Amtrak
635	Jefferson Ave. N.	37 WB	Over Jefferson Ave.
634	Jefferson Ave. S.	37 EB	Over Jefferson Ave.
771	Jefferson Blvd	Airport Connector	Over Jefferson Blvd.
719	Knight	Interstate Rte. 295 NB	Over Interstate 95 SB
*351	Lincoln Ave. RR	Lincoln Avenue	Under Amtrak
633	Lincoln Park N	37 WB	Over 95
631	Lincoln Pk Ramp N	37 WB	Over Ramp B
630	Lincoln Pk Ramp S	37 EB	Over Ramp A
632	Lincoln Pk S	37 EB	Over 95
840	Main Street	Relocated Post Rd.	Under Main St.
832	Masthead Drive	Masthead Drive	Under Amtrak RR

811	Meshanticut B Cul 1	Interstate Rte. 295	Over Meshanticut Bk
830	New Road Underpass	New Road	Under Amtrak RR
721	Pawtuxet River S	Interstate Rte. 295	Over Pawtuxet River
490	Pawtuxet River SE	Bald Hill Road	Over Pawtuxet River
491	Pawtuxet River SW	Bald Hill Road	Over Pawtuxet River
245	Pawtuxet River-East	Bald Hill Road	Pawtuxet River
246	Pawtuxet River-West	Bald Hill Road	Pawtuxet River
P833	Pedestrian Bridge	Pedestrians	Over Amtrak RR
*921	Pettaconsett Ave. RR	Pettaconsett Ave.	Over Amtrak
619	Pettaconsett Ave.	Interstate Rte. 95	Over Access Road B
185	Pontiac	Pontiac Road	Pawtuxet River
*992	Potowomut Road	Potowomut Road	Over Potowomut River
686	South County Fwy.	Interstate Rte. 95	Under S. County Fwy Ramp
683	Toll Gate Rd.	Interstate Rte. 95	Over Toll Gate Rd.
821	Warwick Mall Cul.	Jug Handle Rd.	Over Meshanticut Brook
Number	**Name**	**Street**	**Crossing**
820	W. Natick Rd Cul.	West Natick Rd.	Over Meshanticut Brook
770	Westcott	Metrocenter Drive	Over Airport Connector
160	Woodmansee	West Shore Road	Silver Brook
**518	Barton Corner	Interstate Rte. 95	Over Quaker Lane
** 26	Natick	Providence Street	Pawtuxet River
**235	Quaker Lane	Quaker Lane	Hardig Brook
*/**383	Natick Bridge	East Avenue	Pawtuxet River

Notes:
* - Not maintained by the State
** - Warwick - West Warwick

Table 9
State of Rhode Island
Department of Transportation
1990 Bridge Improvement Program
Projects Scheduled for the City of Warwick
(thousands of dollars)

Rank	Bridge #	Name	Facility Carried	1990	1991	1992	1993	1994	1995
Implementation Schedule:									
33	921	Pettaconsett Ave RR	Pettaconsett Ave	P75	R100	C746	----	----	----
49	722	Bald Hill Rd SB	I-295 SB	P144	----	R100	C1443	----	----

50	722	Bald Hill Rd NB	I-295 NB	P150	----	R100	C1497	----	----
57	683	Tollgate Rd	I-95	P100	----	R100	C996	----	----
58	684	Centerville Rd	I-95	P165	----	R100	C1653	----	----
100	26*	Natick	RI 33 Providence St	----	----	C400	----	----	----
102	637	Hillsgrove RR North	RI 37 WB	----	P129	R100	C1286	----	----
120	2	Greenwood RR	US 1 Post Rd	----	P149	----	R100	C1493	----
152	518	Barton Corner	I-95 NB & SB	----	----	P73	----	R100	C728
207	686	S. County Freeway	I-95	----	----	----	----	P69	R100
212	639	Airport Interchange	Airport Connector	----	----	----	----	P143	R100
226	634	Jefferson Ave S.	RI 37 EB	----	----	----	----	----	P115
241	491	Pawtuxet River SW	RI 2 Bald Hill Rd	----	----	----	----	----	P91
242	246	Pawtuxet River W	RI 2 Bald Hill Rd	----	----	----	----	----	P60
243	490	Pawtuxet River SE	RI 2 Bald Hill Rd	----	----	----	----	----	P90
244	245	Pawtuxet River E	RI 2 Bald Hill Rd	----	----	----	----	----	P60

Table 10
Year 2000 Buildout
Traffic Analysis
Estimated Total New Traffic Generation
by Planning District and Land Use with
Existing Zoning

Planning District	Residential	General Business	Office	Light Industrial	General Industrial	Total
D-1	4,175	7,649-29,704	-	3,005	-	14,829-36,884
D-2	5,251	2,709-10,520	-	-	-	7,960-15,771
D-3	5,623	7,649-29,704	-	-	-	13,272-35,327
D-4	373	6,481-25,166	-	619	-	7,473-26,158
D-5	976	3,293-12,789	2,433	3,097	321-1,046	10,120-20,341
D-6	3,400	6,268-24,341	-	2,386	1,784-5,803	13,838-33,544
D-7	4,949	8,287-32,179	3,426	1,734	-	18,396-42,288
D-8	1,418	-	-	-	-	1,418
Total Citywide	26,165	45,336-164.403	5,859	7,836	2,105-6,849	87,306-211,731

While the Public Transit Authority had experienced a decline in ridership through most of the 1980s, this trend has recently been reversed. Ridership went from a high of 20,834,379 passengers in 1981 to a low of 13,222,957 by 1991. This situation began to change in 1992 when ridership grew by over ten percent. Capital and operating costs for RIPTA are subsidized by the State and Federal Governments.

Meanwhile, auto travel has been increasing its share of the work commute trips in the state of Rhode Island and nationally. Between 1970 and 1980, according to the most recent data available from the Rhode Island Department of Transportation, public transportation ridership's share of the commute nationally declined from 12.2 percent to 6.4 percent while in Rhode Island it declined from 5.3 percent to 4.3 percent. Even though the decline in Rhode Island was less pronounced than that experienced nationally during that period, the public transit share of journey to work trips in this state is only two thirds the size of the share nationally.

In Warwick, there have been reductions in headway during off peak hours for the routes from Gaspee, Oakland Beach, and East Greenwich in recent years as RIPTA has attempted to address increasing operating costs and declining ridership. The West Shore loop service has been reduced from two buses to one bus. There has been no

change in service to the Malls or on the Pawtuxet Valley loop.

Some observers believe that increasing the level of service will increase demand but this may not necessarily be the case. Data collected by RIPTA during the I-195 bridge repairs in Providence in 1989 highlights the overall difficulty in increasing ridership. To help lessen East Bay generated traffic flows on the I-195 Providence River Bridge, the Public Transit Authority supplemented its regular service with eight free buses. This increase in service was free of charge to passengers. It served to draw paying passengers from the regular runs and produced a net increase of ridership of one percent for all trips.

There has been no system wide ridership analysis performed on the RIPTA system since 1984-1985. Ridership has declined across the board since that time.

In order for mass transit to be a truly viable alternative to the family car it must be affordable, accessible, flexible and user friendly. One aspect of RIPTA's bus service which is neither accessible nor user friendly are its bus stops and shelters. They are a frequently overlooked but significant component of the service. Stops are typically marked by a transit authority sticker or sign that conveys no route or schedule information, only a number that can be called to get said information. This is not very helpful when someone is standing by the side of the road, far removed from a pay phone. The stops are generally unimproved, lacking even a bench, a piece of sidewalk, or a wide shoulder to allow the bus to pull out of traffic while making a stop.

While an improvement over the basic bus stop, bus shelters reflect a budgetary compromise for RIPTA. They are actually owned and maintained by private businesses as a combination billboard and shelter. RIPTA benefits by getting a shelter free of charge while the shelter operator gets revenue from the sale of advertising. In some cases the shelters are lighted, in others they are not, thus giving the impression that they are not a very secure environment. This perceived insecurity is further aggravated by graffiti on some shelters. As with the basic bus stops, the shelters do not provide route or schedule information, just an information number.

Since the bus stops and shelters are the prospective passenger's first experience of the bus system, they can and do wield a lot of influence over whether an individual will ultimately decide to use the system.

Unless RIPTA makes a greater commitment to the accessibility and usability of their bus stops they will continue to operate under a substantial handicap.

Para-Transit Service

Para-transit service can be furnished on either a scheduled basis or as a demand-response system. The functional attributes of para-transit are similar to the combination of a fixed route bus system and taxi service and it has become a popular and necessary mode of transportation for many elderly and handicapped persons who are unable to utilize other modes. Warwick is serviced by four para-transit operations - TRANSWICK, SCRITS, RSVP and RIDE, each furnishing a unique service to a selected segment of the population.

TRANSWICK is a service of the City of Warwick, Department of Human Services, Division of Senior Services. It is funded by the Rhode Island Department of Transportation, the Rhode Island Department of Elderly Affairs, and the City of Warwick, and operates three minibuses, two of which are equipped to handle wheelchairs. The service has an annual administrative, operations and maintenance cost of $54,600.

Transportation is furnished to Warwick residents 55 years of age or older, or handicapped individuals, who have no other available means of transportation, for the purpose of grocery shopping, health screenings, senior center programs, and special trips such as to McDermott Pool for the handicapped for physical therapy. Ridership data collected and maintained by TRANSWICK show 3700 passenger trips furnished annually and that 85 percent of the ridership is unable to use fixed route service and 44 percent has no access to the fixed route system. Grocery shopping is the predominate trip purpose, more than double all other trip purposes combined.

SCRITS, Senior Citizens Integrated Rural Transit Services, operates in the City, providing fare free service for senior citizens and the handicapped for medical and meal site trips. The service is not oriented to shopping trips. Some charter services are provided on weekends. The SCRITS operation has 8 vans providing transportation in the Kent County area, including two lift vans operating on a nearly exclusive basis in Warwick. In 1989,

SCRITS provided 48,000 trips in Warwick, including trips arranged through the senior center. Trips for purposes other than medical and meals have a fee structure of $1.50/round trip 7 miles or less and $3.00/round trip greater than 7 miles. Special fares are charged for special trips such as $3.00 for a trip to the Theatre by the Sea.

The "RIDE" program also provides para-transit service in Kent County. This service provides for a "broker" to act as a middleman between State funding agencies that purchase transportation services for their clients and transportation operators who provide the actual service.

There is also RSVP (Retired Seniors Volunteer Program) which furnishes transportation to senior citizens. This is not a para-transit operation per se, because it operates a van that is used to get senior volunteers to and from their volunteer job site. In Kent County there are more than 700 volunteers. The Kent County operation is funded by ACTION, the Federal Volunteer Agency and the local grantee is Warwick Community Action.

The three para-transit providers coordinate their services through referrals. This is made necessary because the three providers do not duplicate services. If a client requests a transportation service that is provided by another carrier, the client is referred to that carrier. According to SCRITS operations personnel, there is an unmet demand in the community that is not well quantified at this time, primarily from the working poor and from handicapped people under the age of 60.

Park-N-Ride Parking Lots

Park-N-Ride parking lots are designed to serve as transfer facilities from single occupancy vehicles to higher occupancy vehicles such as a carpool, vanpool, or bus transit. There are two Park-N-Ride lots in Warwick:

1) Route 117/I-95 and
2) on Airport Road at the Air National Guard facilities.

As shown in Table 11 these facilities are not utilized to their fullest capacity. The Route 117 lot is serviced by both local and Express Bus Service by the RIPTA for trips to Kennedy Plaza and to

Quonset Point. It is also extensively used for carpools and vanpools. Expansion of this lot is being considered by the Rhode Island Department of Transportation. An increased level of police patrols at this lot would help to reduce vandalism and theft problems. The Airport Road lot is served by Express Bus Service to Kennedy Plaza.

Table 11
Rhode Island Department of Transportation
Park-N-Ride Facilities
City of Warwick

Location	Design Capacity	Percent Capacity Average Daily Use 1984-89	Expanded Capacity
1. Airport Road	133	18.8	100*
2. Route 117/I-95	200	78.6	300**

Notes: * None planned
** In design

Trails, Bikeways, Pedestrian Walkways

Warwick has a variety of pathways that are not all necessarily automobile exclusive, which can be considered available for alternative modes of transportation. A good example of this is Narragansett Parkway, a linear park stretching from Spring Green Road in the Spring Green/ Lakewood section to Pawtuxet Village. This is primarily an auto oriented transportation route with scenic views of Narragansett Bay and shaded well-groomed landscaped areas.

Warwick City Park has a circumferential bikeway that follows the shorelines of Brushneck and Buttonwoods Coves. This bikeway is approximately 2.5 miles in length and is totally contained in the Park. Access is from Asylum Road. The bikeway is shared with walkers and joggers and is for purely recreational activities.

Goddard State Park has a network of paved roadways and equestrian trails that can be utilized for walking, jogging, and horseback riding. The roadways are primarily for automobile use as part of the Park's internal circulation system.

There are limited equestrian riding trails in the undeveloped sections of Cowesett, particularly along the I-95 corridor. These are privately owned.

Outside of City and State Parks, there are no formalized pedestrian or bicycle systems in the city of Warwick. Many areas of the city lack sidewalks. Cycling on many of the city's thoroughfares is made dangerous by the lack of bike paths, high traffic volumes and in some cases inadequate lane widths. These deficiencies make pedestrian travel hazardous and limit the bicycle as an alternative mode of transportation.

In 1973, the city, working with Rhode Island School of Design faculty and the firm of Bradford/Everett Associates, prepared a study of pedestrian and bicycle systems in the city. Based on some of the findings and recommendations of that study, the city applied to the Rhode Island Department of Transportation for a Bikeway Demonstration Program Grant to construct a 24.5-mile exclusive bikeway. The grant was not received and the facility was not constructed.

A study, updating this and building upon the 1973 work is needed. It should identify activity centers and routes, including former rail rights-of-way, for pedestrians and bicyclists (see Figures 5 and 6). The routes for pedestrians should not be exclusively limited to roadside sidewalks. Moreover, the bicycle routes can be a combination of exclusive bikeways and existing city streets.

The City should consider submitting project proposals for bicycle facilities to RIDOT's Transportation Enhancement Advisory Committee (TEAC) under the Transportation Enhancement provisions of the Intermodal Surface Transportation Act of 1991 (ISTEA). Possible routes to be considered include:

Pawtuxet River Walk and Narragansett Bikeway - A river walk linking Belmont Park and Pawtuxet Village has been identified by several community groups and the Pawtuxet River Authority as a high priority for Warwick. The Warwick Rotary Club has generously offered to provide funding to initiate work on this project. The City should review land development along the river and work with the developers to accommodate the river walk. This path could be further enhanced if a bikeway tied it to other sections of the city. Such a bike way could follow

Narragansett Parkway, passing through Gaspee and Governor Francis to Warwick Avenue.

Bay Bike Paths - To the east and southeast of T.F. Green State Airport lie waterfront neighborhoods with bay views and access to the water. The City should capitalize on its coastal location by providing bike paths to the shore at Conimicut, Warwick Neck, Oakland Beach, and Buttonwoods/City Park. In some areas it might be possible to provide a separate right-of-way for a bike path by utilizing city-owned portions of the old Warwick Electric Railroad line in Conimicut and Warwick Neck. Portions of these bike paths utilizing public streets should be clearly marked. As roads are scheduled for reconstruction, the need to provide sufficient room to accommodate auto and bicycle traffic should be a major priority.

Pawtuxet Bike Path - The "Pawtuxet Bike Path" would transform the now abandoned Washington Secondary rail line right-of-way into a bike/pedestrian path and linear park running from the Connecticut state line to Providence. This path would intersect the north-south trail which is currently being developed (and will eventually run from northern Rhode Island to the coast in Westerly).

The East Bay Bike Path has demonstrated the popularity of these facilities. It has proved to be a wonderful addition to the communities through which it passes. With the Pawtuxet River Valley's higher population density and scarcity of available open space, a facility such as this is even more important. The opportunity for residents and visitors to utilize such a bicycle facility is one Warwick cannot afford to pass by. The City should vigorously support RIDOT's acquisition of this rail line to preserve the right-of-way and allow for its eventual re-use.

Potowomut Bike Path - The City should investigate possible bikeway routes to link the Potowomut section to Warwick proper. Such a link would build on RIDOT's proposal to construct a bike path from Goddard State Park south to Narragansett Beach. A Potowomut Bike Path could serve as a bridge between the RIDOT project and the Pawtuxet Bike Path, conceivably providing a West Bay link running from Providence to the south shore of Rhode Island.

Sidewalks are virtually nonexistent in many of the city's neighborhoods. This is the result of decades of not requiring the installation of walkways along the roadside at the time of new development. The lack of sidewalks causes pedestrians to walk either

on the street, which is usually the observed case, or on front yards. Without sidewalks, pedestrian movement along the street is hazardous. This is of particular concern where children are required to walk to school, and where residents walk to neighborhood activity centers such as commercial or recreational areas.

The city, in 1985, adopted a policy of requiring sidewalks to be installed in all new residential subdivisions of land. However, there is a need to address the lack of sidewalks in older neighborhoods. Because the construction of sidewalks would occur in front yards, residents may perceive this is a loss of yard/property rather than a gain of a sidewalk. The need for sidewalks therefore must be carefully assessed and a program developed on a neighborhood basis with full citizen participation.

Municipal Parking at the City Hall

There is parking for 195 vehicles at the municipal offices located at the City Hall and the City Hall Annex in Apponaug. These spaces are furnished for employees and visitors to the City Hall, the Annex, Fire Station No. 1, and O'Brien Field and are classified for the following uses:

182	Non restricted spaces for employees and visitors
4	Handicapped access spaces
9	Reserved municipal spaces
195	Total Parking Spaces

The lot is in very good condition with relatively new pavement, new speed control bumps, and signing and striping. There is a need for improved lighting. Portions of the total parking area available exist through lease arrangements with neighboring commercial establishments. There is ample capacity to accommodate employees and visitors during daily activities and for evening events.

There are some safety concerns created in part by the lot's unique location. These are caused by the presence of the fire station, the fact that the lot has multiple access and egress points to Post Road and to Veteran's Memorial Boulevard, and the lot's internal circulation pattern. These safety concerns can be addressed through

signing and enforcement and they are described as follows:

1. Bypass of the traffic signal at Post Road and Centerville Road (Apponaug Four Corners). This problem is caused in part by the one way circulator around Apponaug and the presence of the entrance to the NHD Hardware Store and the Dunkin Donuts Store. Vehicle operators can "cut the corner" at the traffic light by entering the NHD/Dunkin Donut entrance on Post Road and passing through the parking area. This maneuver should be discouraged by an additional speed bump or two en route through the lot, signing that clearly states the prohibition, and police enforcement.

2. Emergency vehicle use of the travel lane from the fire station to the City Hall exit onto Post Road. When there is emergency vehicle response to situations south, west, and north of Apponaug, the emergency vehicles at Station No. 1 exit onto Veteran's Memorial Boulevard to go to Post Road south, Centerville Road west and Route 5 north. If there is a response required to the east, the vehicles cut through the parking lot, essentially "cutting the corner" at Post Road and Centerville Road. Because these are emergency responses, it makes great sense to not become caught in traffic at Apponaug Four Corners. It is also the shortest and quickest response distance. Rather than discourage this practice, the passage can be made safer by adding stop bar striping at points of entry from side travel lanes. This will also slow the cut through maneuver from the NHD/Dunkin Donuts entry.

3. Poor sight lines and poor circulation affect the use of the lot. These conditions are caused by the irregular shape of the parking lot and can be improved by restricting the through movement and by adding the stop bar stripes as described above. Also, in an effort to obtain maximum utilization of the lot, the travel lane directly behind the City Hall has a slightly constricted line of sight to the left (north). This can be relieved by eliminating one space and landscaping the area to prevent illegal parking, opening the view to the left. Loss of this space can be compensated for by reestablishing the one or two parking spaces next to O'Brien Field, which are now obstructed by two Truk-Away dumpsters. To prevent parking in restricted areas, these areas can be landscaped with grass and/or low growing shrubs that will not obstruct views.

Rail Facilities

Amtrak/Conrail Shore Line - The City of Warwick has no rail passenger service. The Amtrak main line between New York and Boston, known as the shoreline, runs through Warwick from East Greenwich to Apponaug through Greenwood, running parallel to Jefferson Boulevard past Norwood and onto Cranston. There are no scheduled passenger stops in Warwick. The nearest passenger stop to Warwick is the Providence Station terminal in Providence adjacent to the State House on Gaspee Street.

The 1990 Mass Transportation Plan for the State of Rhode Island prepared in the 1970's by the Statewide Planning Program called for the development of a commuter rail system in the state that would link the Providence Central Business District to the East Bay and West Bay Communities with light rail mass transit. On the West Bay this system terminated at Quonset Point-Davisville in North Kingstown. There was at least one stop in Warwick. Demand models prepared by the state in the late 1970's concluded that ridership would be insufficient to economically sustain this system at that time.

"Pilot" projects attempting to stimulate ridership from Warwick commuters to Providence and/or Boston have not been successful as costs have far outweighed the benefits. Per passenger mile costs have been prohibitive. However, the Providence to Boston commuter rail service initiated in 1988 through an agreement between the state of Rhode Island Department of transportation and the Massachusetts Bay Transit Authority (MBTA) has been successfully operating. That agreement provided $11.4 million of Rhode Island's mass transportation capital funds for the purchase of equipment and rolling stock while the MBTA assumes all operating expenses. Ridership has averaged 550 passengers per day. This is significantly higher than the 150 to 200 passengers expected at the outset of the service.

A new mass transit initiative by the Rhode Island Department of Transportation is in the making. Under consideration are passenger services on underutilized freight rights-of-way throughout the state as well as on the shoreline. Other R-O-W's will be examined to connect to existing Rights-of-Way. This study should examine the feasibility of establishing commuter rail service from Warwick to Providence with an intermodal stop at Green State Airport. This can be done within the

context of detailed transit travel demand and cost analysis of establishing commuter rail service from Quonset/ Davisville (at West Davisville) to Providence with stops possibly at Forge Road and the airport. The study should also examine the possibility of light rail transit use of the Pontiac and Washington Secondary lines.

Washington Secondary - The Washington Secondary Rail Line is a 14.6 mile line in Providence, Cranston, Warwick, West Warwick and Coventry. The rail line was officially abandoned before the Interstate Commerce Commission in June 1990. The communities of Providence, Cranston, Warwick and West Warwick petitioned the RIDOT to purchase the Washington Secondary rather than let abandonment carve up the right-of-way and render it useless. RIDOT encourages the City to participate in the Rail Corridor Study, which will evaluate the potential for reuse of the Washington Secondary Track and the Pontiac Secondary line.

The use of the right-of-way under state ownership or a negotiated agreement with the P & W, could be for a pedestrian walkway, a bicycle path, light rail rapid transit or rail freight. At or near the terminus of this line the popular Trestle Trail starts and traverses the town of Coventry to the Connecticut State Line. Bicycle paths, trails, or bikeways, are increasingly popular nationally and in Rhode Island. For example, the East Bay Bikeway from Bristol to East Providence is very intensively used and it is planned to be linked to Providence and the Blackstone Valley Linear Park and Bikeway. The Washington Secondary right-of-way can play a similar role, linking the Pawtuxet Valley and Warwick to Providence and the Blackstone Valley.

Other Rail Freight

Pontiac Secondary - The Pontiac Secondary originates at the Shoreline in Cranston and terminates in the Pontiac section of Warwick near Route 5. The line is owned by the Providence and Worcester (P & W) railroad and is 5 miles in length. It serves the Howard Industrial Park in Cranston and the 1.8 miles of track from Howard to the terminus in Warwick have been out of service since the 1970's due to a lack of demand and poor track conditions. Service at Howard is on an as needed basis and the bridge crossing at the Pocasset River is ranked fourth by the State for

rail improvements to be funded by the local Rail Service Assistance Act of 1978. Any rehabilitation of the Pocasset Avenue Bridge should consider at grade crossings and overall line rehabilitation and potential freight use. The 1.8 mile section between Howard and Warwick could be brought back into service if the industrial activities in Warwick were to require rail freight service, or if a passenger terminal were determined to be feasible for servicing the Mall. Another alternative could be a pathway for pedestrian or bicycle use. The line is proposed for abandonment by the P & W Railroad Company.

Warwick Industrial Track - The Warwick Industrial Track originates at the Shoreline in Cranston and is .9 miles in length. It is owned by the Providence and Worcester railroad and service is on an as needed basis. The Pawtuxet River Bridge is in very poor condition. The line is not eligible for funding under the local Rail Service Assistance Act and it is proposed for abandonment by the P & W Railroad Company. This line should be evaluated for use in conjunction with the proposed Pawtuxet River Walkway.

Marine Terminals and Facilities

Warwick is considered the boating capital of Rhode Island based on the sheer volume of public access to the water through its boating facilities (Harbor Management Plan, April 1989). The city has approximately 39 miles of shoreline and eight major coves; however, in spite of extensive marina facility development in several coves, there are no marine terminals for the mass movement of goods or passengers. In this respect, the City's maritime tradition differs from present conditions.

Commerce, not recreational boating, was the focus of the navigable coves such as Old Warwick Cove, now home to approximately 1600 recreational craft and 11 marinas. Apponaug Cove, which was navigable up to Post Road during the 18th and early 19th centuries, supported thriving commerce that was comprised of shipbuilding, trading, merchandising of West India goods, and the cotton mill. The village of Apponaug in fact was such a busy commercial center that some early enthusiasts believed the area would "...be bigger than London" (Fuller, The History of Warwick, Rhode Island).

It is unlikely that Warwick will regain a place of importance as a center of waterborne commerce. Factors working to the city's disadvantage in this respect are the lack of deep water facilities and the

nature of 20th century waterborne commerce. The Port of Providence and Quonset Point-Davisville fulfill this role in Rhode Island today; however, there may be additional recreational and commuter passenger terminal opportunities in Warwick's future. The park system of the Bay Island is continuing to be developed by the Rhode Island Department of Environmental Management and a marine terminal has been proposed for Goddard Park.

A study of marine transportation is planned by the State Department of Transportation. A number of potential recreational and/or passenger terminal locations should be examined by the state study (see Figure 8). These are as follows:

General Location

Preliminary Analysis Factor	Pawtucket Cove	Conimicut	Rocky Pt. Park	Oakland Beach	City Park	Apponaug Cove	Chepi-wanoxet
Marine Access							
Water Depth	Adequate	Shallow	Adequate	Adequate	No	Shallow	Shallow
Channel	Yes	No	No	Yes	No	Yes	No
Congestion	Some	No	No	Some	No	Some	No
Available	Poss	No	Poss	Poss	No	Poss	No
Environmental Factors							
CRMC Class	NP	NP	NP	NP	PP	NP	NP
Water Quality	NP	NP	NP	NP	PP	NP	NP
Dredging	No	Prob	No	Poss	Poss	Poss	Poss
Landside Access							
Roadways Available	Good	Good	Ltd	Ltd	Ltd	Good	Ltd
Parking	Ltd	Some	Yes	Ltd	Ltd	Ltd	Yes
Proximity to Population Activities	Good	Good	Good	Good	Good	Good	Ltd

Key: Prob - Probable Poss - Possibly Ltd - Limited
NP - Not Prohibited PP - Probably Prohibited

T.F. Green State Airport

The T.F. Green Airport is a State owned and operated facility. The original terminal was dedicated in 1931 and was located on Airport Road (Occupastuxet Road). The current terminal was constructed 30 years later and opened in 1961 to accommodate the demand for air travel and changing technology. In 1980, four new gates and the present concourse were added. The current facility occupies approximately 1000 acres or 4.5 percent of the city's land area. While passenger service at the airport had steadily grown, to a peak of 2,458,916 passengers in 1990, there has subsequently been some reduction in the number of passengers utilizing the airport. The airport, has significant local and regional economic importance. An estimated $346.6 million in direct economic activity and $437.5 million in total direct, indirect and induced economic activity results from the airport. In terms of freight values, the facility is important for goods movement, particularly for export from the local market, $53.2 million in goods were shipped while $30.6 million were received at T. F. Green Airport in 1988.

The airport also produces some highly localized negative impacts, most particularity traffic, congestion, and noise. The main terminal is served primarily from the airport connector by auto. Surveys conducted on passengers have found that 76 percent arrived at Green by utilizing the connector from I-95. A total of 23 percent arrived via Post Road. Of those surveyed, 76 percent traveled to the airport via private auto while 14 percent traveled via rental auto. In spite of nearly 2000 parking spaces and excellent access to the terminal via Post Road and the airport connector, parking is overloaded and the roadways are congested during the morning (6 a.m. to 7 a.m.) and afternoon (4 p.m.-5 p.m.) peak arrival and departure times. Current expansion plans for the air terminal facilities are considering major improvements to Post Road and the connector to enhance access to the terminal. In addition to the ten TIP highway projects shown in Table 7, $72.3 million is programmed for improvements at T.F. Green Airport as part of the TIP. The $35 million planned for the terminal expansion will be funded from state bonds, and a $21.2 noise mitigation program is being funded with FAA discretionary funding as itemized in Table 12.

Table 12
T.F. Green Airport Improvement Program
October, 1989 to September, 1995
(Cost in thousands of dollars)

Project Description	1990	1991	1992	1993	1994	1995
Overlay runway 5R-23L	0	0	0	2250	0	0
Update runway sensor system	0	0	0	0	0	300
Airport access control system	600	0	0	0	0	0
Acquire aviation and clearance easements: remove trees and obstructions	0	1000	0	0	0	0
Pavement management system program	200	0	0	0	0	0
Construct holding apron: construct taxiway "K" to runway 34	1500	0	0	0	0	0
Sealcoat taxiways "J" and "F"	0	150	0	0	0	0
Overlay runway 16-34	0	0	2000	0	0	0
Sealcoat all taxiways not new or rehabilitated	0	0	0	500	0	0
Overlay north ramp	0	0	0	300	0	0
Overlay north ramp taxi route	0	0	0	0	0	300
Construct oil/water separator (east ramp)	0	0	750	0	0	0
Construct oil/water separator (north ramp)	0	0	0	750	0	0
Construct air carrier ramp (diverted aircraft maintenance garage and warehouse	0	0	0	0	750	0
New emergency generator	0	250	0	0	0	0
Construct maintenance garage and warehouse	0	700	0	0	0	0
Vehicle replacement	400	425	625	0	0	0
Noise mitigation programs (phases I-VI)	3200	2000	4000	4000	4000	4000
Master plan update	150	0	0	0	0	0
Construct airport perimeter/security road (phases I-IV)	0	250	250	0	500	500
Short term terminal expansion	11000	24000	0	0	0	0
Sanitary landfill	0	0	750	0	0	0
Total Cost	**17050**	**28775**	**8375**	**7800**	**5250**	**5100**

Noise is perhaps the largest and most pervasive environmental problem associated with airport operation (see Figure 9). This can be mitigated or eliminated by several approaches:

1) Shift air carrier operations elsewhere. The State of Rhode Island does not consider this to be a realistic approach. Studies in 1973-74 associated with the naval facilities at Quonset Point, and in 1980, concluded that T.F. Green airport should remain as Rhode Island's air carrier airport.

2) Curtail flights and/or limit hours of operation. Data furnished by the Draft EIS for the terminal area plan (May 1990) show that takeoffs and landings at the airport have decreased from 273,000 in 1973 to 193,000 in 1989, a drop of nearly 30 percent. However, the increase in passenger activity by nearly 200 percent for a comparable period indicates the planes have become larger. Hours of operation are from 6 a.m. through 11:59 p.m.

3) Utilize more efficient, quiet engines for planes. The newest planes, known as stage three aircraft, utilize state of the art noise reduction technology.

4) Soundproof area homes, schools, and businesses. This is currently being accomplished within the most noise-impacted areas, and will take several decades to complete.

Warwick experiences benefits and liabilities from being the host community for the State Airport. Since the airport is likely here for the long term, Warwick should seek to maximize those benefits while at the same limiting its liabilities. Critical to this is the inclusion of the City's intermodal transportation goals into the T.F. Green redevelopment plans.

The airport upgrade also gives Warwick a unique opportunity to enhance those areas

abutting the facility. The City should consider a range of projects in the airport area to make this happen, and make every effort to coordinate those projects. An "airport gateway" project presently being proposed for Post Road could be linked to other projects, including:

Rail Passenger Station - The Intermodal Surface Transportation Efficiency Act (ISTEA) requires consideration of intermodal transportation options as part of local and regional transportation projects. A link between T.F. Green State Airport and Amtrak's Shore Line is feasible due to the proximity of the two facilities. Such a rail passenger station would provide an intermodal connection to Green's air passenger operations providing passengers with a viable alternative to the automobile for coming from and going to the airport. This facility would be further enhanced with extension of the Massachusetts Bay Transit Authority (MBTA) commuter rail service south of Providence.

Green Pentagon - T.F. Green Airport is the gateway to Rhode Island for many visitors. It is where first impressions about our community and our state are formed. Consequently, it is essential that this gateway be as attractive as possible. The "Pentagon" concept takes the gateway one step further to include five roads which surround the airport and define traffic patterns for the city. Funding is available in part through the enhancement provisions of ISTEA, as part of reconstruction projects for Post Road, Airport Road, Warwick Avenue and West Shore Road. The "Pentagon" could be further enhanced through development of an airport overlay zone to guide development and redevelopment in this area.

An alternative to continued airport expansion ad infinitum and the contentious public debate that goes hand in hand with the proposals for expansion, may be the development of high-speed rail. This has been proposed in the past, particularly for the "Eastern Metropolitan Corridor", but development of a system employing this feature has never been seriously engaged.

The congestion experienced and predicted at T.F. Green Airport is not unique to Green. According to sources close to the issue of air traffic and alternatives such as magnetically levitated rail (Issues, Spring, 1990), and the FAA, it is predicted that by 1996 there will be 32 severely congested airports.

Magnetic levitation of trains is one alternative approach that interestingly was proposed and researched in the United States at Brookhaven National Lab and elsewhere, but has been only seriously pursued by the Japanese and the West Germans. This technology will propel a train at speeds of 250 to 300 mph and Japanese and German prototypes are now in place and are planned for fully operational expansion. The

Germans are marketing this technology in the U.S. and elsewhere, and Maglev systems are proposed for Florida, California, Nevada and Pennsylvania.

Maglev would not replace air travel, but it could replace the short inefficient air flights of less than 500 miles. The Maglev system could be linked to the airport hubs and the major cities in the northeast, including T.F. Green Airport and/or Providence. As the EIS for the Green Airport Terminal Expansion notes, 39 of 53 flights are to New York. This 200-mile trip is ideal for Maglev. It is also ideal for conventional rail service on the AMTRAK shoreline (see Rail Section).

In 1986, the Coalition of Northeastern Governors reviewed the rail corridor improvements options for the most cost effective method of improving rail passenger service between Washington and Boston. The Coalition decided that Maglev will be too expensive and that there are other alternatives to enable the rail trip time from Boston to New York to be reduced from its current 4.5-hour duration to 3 hours. The most significant improvements will be to the rail infrastructure in Connecticut to eliminate the existing delays caused by the electrified rail system, which requires switching from diesel to electric powered locomotives. The improvements will allow dual powered locomotives to operate without the delays.

Clearly, city involvement in the decision making process concerning future development of Green Airport is a public desire. This can be accomplished through the creation of an airport authority. The attitude survey conducted by the city for the 1986-1991 Land Use Plan found 57 percent of the respondents opposed to additional runway expansion at Green and 76 percent in favor of greater local control over development at the airport.

In 1986, Warwick negotiated an agreement for state compensation to the City for services rendered for police and fire protection and inconveniences suffered as the host City. Agreements such as these are typical in communities where unique regional or statewide facilities impact the community. Noise compliance monitoring by the state, city, and the airlines is another method of mitigating the impacts on the host community.

CHAPTER 3

DEVELOPMENT STRATEGY AND IMPLEMENTATION PROGRAM

Goals and Policies

General

1. Provide the City of Warwick with a balanced transportation system that meets the needs of its citizens by developing a related network of local roads and highways, public transportation, rail service, parking, pedestrian walkways and bicycle travel ways.

2. Promote the development of the transportation system in response to the desired and planned patterns of future land use and reuse.

3. Integrate and maintain the local transportation network within the state and regional context.

4. Encourage public participation in the planning, design, function and operation of the streets on which they live and the transportation systems that they rely on.

Streets and Roadways

1. Improve existing local streets and highways in order to facilitate present and anticipated volumes of automobile traffic and provide for adequate off street parking within the City.

2. Develop and implement an improved, systemized pavement management program utilizing a computerized mapped database to identify roadway pavement and drainage problem areas, to classify pavement and drainage according to condition ratings, and to develop priorities for maintenance and repairs.

3. Where roadway and pavement design is inadequate, surface overlay, repaving, or reconstruction should be scheduled.

4. Local street, collector and highway designs should be in accordance with AASHTO geometric standards for horizontal and vertical

alignments and pavement widths, as shown in Appendix A.

5. Prepare an urban forestry plan and implementation program for street tree planting to maintain and enhance the community's appearance, to aid in air quality improvement, and to assist in traffic noise abatement on local streets as well as on roadways on the state aid system.

6. Develop a citywide sidewalk improvement plan to increase pedestrian safety and access within neighborhoods and to schools, senior centers, recreational facilities, commercial centers and the regional transit system. Priority should be given to linking the aforementioned activity nodes as well as providing intermodal links with RIPTA's transit routes.

7. Continue to encourage the Rhode Island Department of Transportation to prepare a feasibility study of the extension of Route 37 to serve the eastern sections of the city.

8. Work with the Rhode Island Department of Transportation to study the feasibility of developing direct access to Metro Center from the Airport Connector. Access to the Airport Connector from Metro Center is seen as desirable due to the access problems associated with the existing egress points at Jefferson Boulevard and the Coronado Street extension. Current traffic-circulation problems could be further complicated by the rail passenger station proposed for the Kilvert Street-Jefferson Boulevard area. This facility will provide an intermodal connection with the air passenger terminal at T.F. Green Airport. Development of a Metro Center interchange on the Airport Connector would separate traffic associated with the air terminal, rail facility and the Post Road commercial corridor from industrial and business traffic associated with the industrial developments west of Jefferson Boulevard.

9. Work with the Rhode Island Department of Transportation to study the feasibility of improving access to Route 2 by adding ramps to the I-95/Route 2 interchange as recommended in the Ground Transportation Element of the State Guide Plan.

10. To improve transportation energy efficiency, minimize traffic impacts on existing older neighborhoods and to enhance public safety, residential subdivisions of land should have two

points of access and egress onto a collector or minor arterial street and interconnections with adjacent subdivisions where possible.

11. When proposed subdivisions of land are adjacent to tracts of undeveloped land, the proposed circulation system should be designed to accommodate future interconnections.

12. Continue to require the installation of sidewalks in new subdivisions to assure safe pedestrian movement.

13. Investigate on a planning district level the potential for improving east - west traffic circulation.

14. Require the inclusion of safe pedestrian movement, bicycle transportation, and streetscape aesthetics in the planning and design of all new state and city roadways and roadway improvements.

15. Consider the implementation of a Development Impact Fee system to assist the city financially to maintain and improve public infrastructure.

16. Recognize the potential negative impacts of new and reconstructed roadways on the city's character and develop designs that preserve Warwick's outstanding historic manmade and natural landscape, protecting to the maximum extent possible shade trees, stone walls, historic buildings and structures, and unique natural features.

Public Transportation

1. Maintain and efficiently expand the fixed route bus system servicing the City of Warwick by the Rhode Island Public Transit Authority.

2. Encourage the Public Transit Authority and Division of Planning, Department of Administration to perform ridership and levels of service analyses and to seek methods to increase ridership such as by improving headway where warranted, through better marketing, and through the identification of new routes and route modifications.

3. Work with the R.I. Department of Transportation, the Public Transit Authority, the Division of Planning, Department of

Administration and adjacent communities to increase public transit options and to expand public transit service.

4. Maintain and expand existing para-transit operations to serve the elderly and handicapped populations and to reach those citizens in need that currently do not meet service criteria.

5. Route and schedule information should be displayed at bus stops. This should include a graphic that will let the rider know what other routes interchange with the one served by the stop.

6. As part of all road reconstruction undertaken by RIDOT and/or the City, a wide shoulder allowing the bus to pull out of the lane of traffic should be designed into each stop.

7. All bus shelters should be equipped with lighting to enhance security.

8. Bus stops not improved with shelters should at a minimum have a segment of sidewalk for patrons that will allow them to wait for a bus out of the lane of traffic.

9. Bus shelters located at major activity centers (i.e., the airport, malls, park and ride lots, etc.) should be further enhanced by attractive landscaping to make them visually inviting.

Marine Terminals and Facilities

1. Consider the development of one or more terminals for waterborne transportation to the Bay Islands Park System and other state and municipal bayside recreational facilities.
2. Encourage the Departments of Transportation and the Department of Environmental Management to work with the City to identify marine terminals for recreational and journey to work trips.

Municipal Parking at the City Hall

1. Improve the safety lighting and circulation of the municipal parking facilities at City Hall through the installation of a mandatory stop for easterly movement at the northeast corner of City Hall, signing and enforcement to restrict through movements by drivers attempting to short cut Apponaug Four Corners, installing lighting and implementing the more efficient use of spaces through landscaping to improve line of sight at the northeast corner of the City Hall.

2. Undertake a design/circulation study to determine if segregating emergency vehicle movements from general parking movements is feasible.

3. Improve bicycle accessibility to municipal offices by furnishing bicycle storage areas.

Rail Facilities

1. Preserve the existing rail rights-of-way, utilizing public acquisition if necessary, when rights-of-way are proposed for abandonment.

2. Work with railroad owners and operators, the Federal Rail Administration, and the state of Rhode Island's Department of Administration, Division of Planning; to prepare the State Rail Plan and to maintain and improve rail service to the City's industrial areas as warranted.

3. Encourage and work with the Rhode Island Department of Transportation to study the feasibility of establishing commuter rail transit stops at Forge Road and Green State Airport as part of the proposed West Bay Commuter Rail System.

Trails, Bikeways, Pedestrian Walkway

1. Develop a master plan for bikeway development for the City of Warwick to connect the major city and regional recreational facilities, parks, and unique natural areas, emphasizing the village concept of the City whenever possible and utilizing existing rights-of-way where possible.
2. Evaluate the feasibility of developing a bikeway and pedestrian walkway on the Washington Secondary and Pontiac Secondary rail line, and the Warwick Industrial Track as part of the bikeway master plan.
3. Develop a nature trail/pedestrian walkway along the Pawtuxet River from Belmont Park to Pawtuxet Village, and explore the feasibility of extending the walkway or developing additional segments of a river walkway to the west of Belmont Park.

Airport

1. Support the implementation of the noise abatement and land use measures that have been identified in the Airport Noise Control and Land Use Compatibility Study for T.F. Green State Airport.
2. Discourage any proposal to expand Airport runways.
3. Utilize the Airport location within the city to promote local economic development efforts.
4. Encourage the development of alternative modes of transportation for trips less than 200 miles in distance, such as high speed rail and the improvement of the Boston to New York Rail Corridor to reduce rail travel time to New York City.

Commercial Parking

1. Widening of the city's major arterials to accommodate increasing traffic loads has adversely impacted many of the older strip commercial areas in Warwick. These areas are characterized by small commercial establishments on small lots with limited off

street parking area. Road widening has, in many instances, reduced already deficient off street parking areas. To address this problem the plan recommends working with area merchants to identify land parcels than can be developed into shared parking facilities to offset onsite parking lost to road expansions.

Recommendations	**Immediate (1 to 2 years)**	**Short Term (3 to 5 years)**	**Long Term (6 to 10 years)**
General			
Provide the city with a balanced multi-modal transportation system that meets the needs of its citizens.	X	X	X
Promote the development of the transportation system in response to the desired and planned patterns of future land use and reuse.	X	X	X
Integrate and maintain the local transportation network within the state and regional context.	X	X	X
Encourage public participation in the planning, design, function and operation of the streets on which they live and transportation system that they rely on.	X	X	X
Streets and Roadways			
Improve existing local streets and highways in order to facilitate present and anticipated volumes of traffic and provide for adequate off street parking within the City.	X	X	X
Develop and implement an improved pavement management program utilizing a computerized mapped database to identify roadway pavement and drainage problem areas, to classify pavement and drainage according to condition ratings, and develop priorities for maintenance and repairs.	X	X	
Prepare and urban forestry plan and			

Recommendations	Immediate (1 to 2 years)	Short Term (3 to 5 years)	Long Term (6 to 10 years)
implementation program for street tree planting to maintain and enhance Warwick's appearance, its air quality, and reduce noise levels.	X	X	
Work with RIDOT to prepare a feasibility study for extension of RT. 37 to serve the eastern sections of the City.	X		
Work with RIDOT to explore the feasibility of developing a direct access to the Metro Center from the Airport Connector.		X	
Work with RIDOT to explore the feasibilty of improving access to Rt. 2 from I-95 through construction of additional ramps at the I-95/Rt2 interchange.	X		
Work with RIDOT in the design and construction of the Apponaug Bypass.	X	X	
Make all efforts to interconnect subdivisions in order to provide for more through roads for traffic circulation. Require that all subdivisions provide at least two points of vehicular access.	X	X	X
Continue to require the installation of sidewalks in new subdivisions to assure safe pedestrian movement.	X	X	
Consider a development impact fee system to assist the City financially to improve public infrastructure to service new development.		X	
Public Transportation			
Expand intra-town and inter-town RIPTA bus service for Warwcik.		X	
Work with RIPTA to increase ridership.		X	
Route and schedule information should be		X	X

Recommendations	Immediate (1 to 2 years)	Short Term (3 to 5 years)	Long Term (6 to 10 years)
displayed on signs at each stop in Warwick			
Improve bus stop amenities and security through lighting, sidewalk improvements and in some cases bus shelters.		X	X
Upgrade bus stops at major activity centers (airport, malls, etc.) with landscaping.	X	X	
Marine Terminals and Facilities			
Explore the development of a marine passenger terminal in Warwick.		X	
Municipal Parking at City Hall			
Improve safety lighting and circulation in the municipal complex parking lot through the installation of signage, landscaping, lighting and through increased enforcement of traffic restrictions.	X	X	
Undertake a design/circulation study to determine if segregating emergency vehicles from general parking movements if feasible.		X	
Improve bicycle accessibility to municipal offices by installing secure bicycle storage areas.		X	X
Rail Facilities			
Preserve existing rail rights=of-way (ROW) utilizing public acquisition if necessary when ROW is scheduled for abandonment.		X	
Work with FRA, RIDOT, Dept. Of Administration on updates to the State Rail Plan to maintain and improve rail service the the City=s industrial areas as needed.		X	

Recommendations	Immediate (1 to 2 years)	Short Term (3 to 5 years)	Long Term (6 to 10 years)
Work with RIDOT and Amtrack to develop an intercity/commuter rail passenger facility at Kilvert Street to service T.F. Green Airport.	X	X	
Trails, Bikeways, Pedestrian Walkways			
Develop a master plan for bikeway development within the City to connect major City and regional activity centers, parks, and unique natural areas.		X	
Evaluate the feasibility of developing a bikeway and pedestrian walkway on the Washington and Pontiac Secondary rail lines as well as the Warwick Industrial Track.		X	
Develop a nature trail pedestrian walkway along the Pawtuxet River from Belmont Park to pawtuxet Village, and explore the feasibility of developing additional segments of a river walkway west of Belmont Park.	X	X	X
Airport			
Support the implementation of the noise abatement and land use measures that have been identified in the Airport Noise Control and Land Use Compatibility Study for T.F. Green Airport.	X	X	X
Discourage any proposal to expand Airport runways		X	X
Utilize the Airport location within the City to promote local economic development efforts.	X	X	X
Encourage the development of alternative modes of transportation for trips of less than 50 miles, such as the high speed rail initiative in Amtrack=s northeast rail corridor between New York and Boston.	X	X	
Actively work with RIDOT to minimize	X	X	

Recommendations	Immediate (1 to 2 years)	Short Term (3 to 5 years)	Long Term (6 to 10 years)
adverse impacts of the planned terminal expansion at T.F. Green.			

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APPENDIX A

RECOMMENDED DESIGN STANDARDS FOR STREETS AND HIGHWAYS (1)

	Local street	Collector Street	Arterials
Right of Way Width	50'-60'	60'-70'	70'-80'
Pavement Width	22'-36'	36'-40'	42'-52'
Sidewalk Width	0'-6'	4'-6'	6'-8'
Maximum Grade	15%	12%	10%
Design Speed	25 MPH	35 MPH	40 MPH

APPENDIX B

STATE OF RI 1995-2005 FUNCTIONAL CLASSIFICATION MILEAGE

APPENDIX C

BUILDOUT TRAFFIC IMPACT ANALYSIS

ATTACHMENT 1

RELEVANT STATE GUIDE PLAN GOALS AND POLICIES